First round comments from the Ad-hoc rewiew committee (Maurik Holtrop, Kevin Giovankl, Zein-Eddine Meziani)

August 28, 2018

Dear Mohammad Hattawy,

We have reviewed your paper, "First exclusive Deeply Virtual Compton Scattering measurement off bound nucleon in ^{4}He", and have compiled an initial set of comments.

First, we think these are interesting results, and we think that the paper is fairly well written.

We would like to ask for some clarification on several points, and suggest that these are addressed in the paper. The following list is loosely arranged in order of importance:

1. For figure 6, you state that "our experiment shows a sharp drop" (line 250), in the incoherent A_{LU}/proton A_{LU}. You do indeed have a single point, at the lowest x_B, that is lower than the other three, but it seems that I can draw a straight horizontal line through all 4 error bars. It seems too strong a statement to speak of a sharp drop here, and subsequently conclude that there is "strong quenching of the BSA" (line 253). If I contrast this graph with figure 5, where you state that "A_{LU} does not indicate a strong dependence on Q^2", I agree with you. The variation between the point in figure 5 is however similar to that in figure 6, except the order of the variation is different.
The text is updated. We show the dependence on t as it is mostly related to the modifications of the GPDs.

2. To further consider this statement, I looked up ref. 21, which contains the proton data that you divide by. This data is not, however, shown as a function of x_B, but in a set of tiles, with variation in -t shown for different x_B and Q^2 average values. It is then not quite clear how you used this data to get the data points to divide out the proton A_{LU}. How closely do the kinematics agree? How does this procedure affect the systematic uncertainties? This is important information to make a judgement on the validity of your figure6.
For this specific purpose, we applied four dimensional binning to our incoherent DVCS data to get kinematical mean values close to the published free proton results. The review committee members are invited to check Appendix J in the analysis note.

3. The paper makes no mention of the initial momentum of the struck nucleon, which I would expect to smear out the kinematics. It would be useful for the reader to get an impression on how large this effect would be. Does this explain the widths of the distributions in figure 2, or are these widths dominated by detector resolution?

We have studied this effect, we updated the paper to address the question. The review committee members are invited to check appendix H in the analysis note for more details.

4. There is also no mention of final state interactions in the paper. It is not obvious to me that the FSA should be zero for a beam spin asymmetry on 4He. If you have a calculation that shows this is the case, it would be good to mention it.

   There are no such theoretical calculations of the FSI on the incoherent DVCS asymmetries on the ^{4}He. A statement has been added toward the end to address this point.

There are also number of minor initial edits and stylistic suggestions that we would like you to consider. This list is in chronological order:

1. In the title, add an "a": "Deeply Virtual Compton Scattering off a bound proton", or make proton plural (protons).
   Updated. "protons"

2. First sentence of abstract, does "measurement of incoherent deeply virtual..." work better?
   Updated.

3. Third sentence, replace "have been compared" with the more active "are compared"
   Replaced.

4. Line27: leave out "the fact"
   Cleaned.

5. Rephrase line 34. Perhaps: "correlations can be revealed"
   Cleaned.

6. Line 46 - 49: Perhaps make it more clear that in the coherent case the scattering is off the entire nucleus, and that for the incoherent case the nucleon is ejected? Is that a correct interpretation of what is going on?
   Updated.

7. Line 78: "amplitude that contains", or make amplitude plural.
   Cleaned.

8. Line 154, you do not define what was used for t_{min}, and how it was determined.
   The definitions is added.

9. Line 206: To make it more clear to the reader what you are doing with the data, you should explicitly state that you make a fit of the ϕ distributions, and then extract the a_0 value as $A_{LU}(90)$. You should also explicitly state that when plotting versus one kinematic variable, you integrate over all the other kinematic variables. This relates to comment #2 above.
   Cleaned. (I am not sure this is needed as it is mentioned at the beginning of the paragraph).

10. Line 207: "Fig 4 presents ..." and line 215: "We present in Fig 5". One is passive, the other active. It is probably better to choose one or the other, but not mix them.
    Cleaned.

11. Line 221: Either "Their model uses a nuclear spectral function" or "Their model uses nuclear spectral functions".
    Cleaned.

12. Line 238: -> "on a free proton target".
    Corrected.

13. Line 241: "ratios show 20%-40% lower asymmetries" (drop "a")
    Corrected.

14. Line 243: rewrite to not have "effect" twice in the sentence so close together.
    Cleaned.

15. Line 260: Rewrite your last sentence. Suggestion: "This surprising result opens a new avenue for progress in understanding quarks and gluons in the nuclear medium."
    Added.